REMARKS

Claims 1-9 and 15-21 are in the case as of the date of this amendment. No claims have been allowed.

Claim 12 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. This rejection is no longer applicable in view of the cancellation of claim 12 made in the instant amendment.

Claims 1, 2, 8-11 and 13-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hiller et al. (U.S. 6,914,343) in view of Koyanagi et al. (U.S. 5,430,322).

Claims 3, 4, 12 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hiller et al. in view of Koyanagi et al. as applied to claims 1, 2, 8-11 and 13-17 above, and further in view of Roesner et al. (U.S. Pub. 2003/0112603) and Pionetti (U.S. Pub, 2004/0156684).

Claims 5 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hiller et al. in view of Koyanagi et al. as applied to claims 1, 2, 8-11 and 13-17 above, and further in view of Chao et al. (U.S. 4,448,028).

Claims 6, 7, 20 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hiller et al. in view of Koyanagi et al., further in view of Chao et al. as applied to claims 5 and 19 above, and even further in view of Roesner and Pionetti.

These rejections are respectfully traversed. More specifically, Applicant respectfully requests that the Hiller et

al. reference be eliminated from consideration against Applicant's claims because the date of invention in the instant application is prior to the effective date of the patent to Hiller et al. Briefly, Applicant conceived of the claimed invention on January 23, 2003, and reduced the invention to practice by February 28, 2003. As evidence of this, Applicant has attached hereto a declaration made by Applicant under 37 CFR 1.131 along with exhibits to support Applicant's earlier date of invention. With respect to the claims in the instant application, the relevant priority date of Hiller et al. is April 3, 2003, i.e., the filing date of the provisional application number 60/460,057. Accordingly, Applicant respectfully submits that Hiller et al. should not be considered as prior art against Applicant's claims, and respectfully submits that all rejections under 35 U.S.C. 103(a) based on Hiller et al. are no longer applicable.

Even if Hiller et al. could be cited as a reference against Applicant's claims, none of the prior art cited by the Examiner appears to teach or even suggest the unique combination taught by Applicant.

Hiller et al. appear to teach an electric generator system that produces electric power from environmental temperature changes occurring at a location during a normal summer day. A thermoelectric module 76 is positioned between a container 70 housing a phase-change mass and a finned element 78 exposed to the environment. A system is deployed at a particular location, and is reliant on and limited by naturally-occurring temperature

changes at that location. See column 4, lines 5-34; column 6, lines 40-50; and column 12, lines 8-20.

Koyanagi et al. appear to teach a thermoelectric element sheet in which thermoelectric semiconductors are mounted between films. In the embodiment cited by the Examiner, the thermoelectric element sheet 11 is wrapped about a pipe 12. Sheet 11 is then wrapped by a conductive medium 15 that, in turn, is encased by a pipe 13. This arrangement is positioned in seawater near the surface thereof (i.e., where the temperature is warmer) while cold water from a deep portion of the sea is pumped through pipe 12. See column 8, lines 37-59.

Roesner et al. appear to teach a thermal interface that includes a phase-change material. Several examples of phase-change materials are listed in paragraph 19.

Pionetti appears to teach an underwater pipeline connection used in the construction of vertically-oriented "riser" for extracting oil from an undersea wellhead.

Chao et al. appear to teach a thermoelectric system that incorporates rectangular heat pipes 38. Approximately 5-10% of the interior volume of heat pipes 38 comprises a working fluid that vaporizes and then condenses within heat pipes 38. Thermoelectric devices 24 are coupled to heat pipes 38. See column 6, line 29 to column 7, line 4.

In contrast, Applicant teaches and claims (in claim 1 for example) an underwater power generator that includes an underwater vessel for navigating through a body of water in order to transit

through an underwater thermocline having a temperature range. At least a portion of the underwater vessel's shell is made from a thermally conductive material. The outer surface of this portion of the shell is in contact with the body of water. An inner surface opposing the outer surface is not in contact with the body of water. Each of a plurality of thermo-to-electric energy converters has a first surface thermally coupled to the inner surface while a phase change material is thermally coupled to each second surface. The phase change material has a phase change temperature that is approximately equal to an average of upper and lower temperature extremes of the temperature range of the underwater thermocline. As the underwater vessel navigates through the body of water so that the underwater vessel transits through the underwater thermocline, the thermo-to-electric energy converters generate electrical power. Similar amendments have been made to Applicant's method claim 15. Support for the amended claim language can be found in Applicant's originally-filed specification at page 3, lines 17-24 and page 6, lines 19-26.

None of the prior art taken alone or in combination teach Applicant's unique underwater power generator and power generating method in which a navigating underwater vessel is controlled to transit an underwater thermocline to thereby generate electric power. Hiller et al. merely teach an electric generator system that is positioned or stationed at a location. Electrical power is generated as the temperature at that location changes due to natural weather conditions. That is, power generation is limited

by weather conditions at the location as noted at column 6, lines 40-41. Accordingly, there is nothing within Hiller et al. to teach or suggest navigated movement of an underwater vessel in order to controllably transit an electric power generation system (incorporated into the underwater vessel) through an existing underwater thermocline as Applicant teaches and claims. Indeed, the teachings of Hiller et al. do not contemplate any navigated movement of its electric generator system once it has been positioned at a location.

Even if one accepts the Examiner's assertion that Hiller et al.'s stationary electric power generation system is "moving" due to planetary movement, this "movement" is not navigated and does not teach or suggest navigated movement through a body of water as Applicant teaches and claims. This difference between the Hiller et al. and Applicant's teachings and claims is significant. Applicant can actively control energy production whereas Hiller et al. is passive in terms of such control and is at the mercy of whatever the environment provides at the system's location. Furthermore, Applicant's system and method has a much faster response time as it only takes a matter of seconds or minutes to transit through an underwater thermocline whereas it takes a planetary day for the system in Hiller et al. to experience the temperature change necessary to produce electric power.

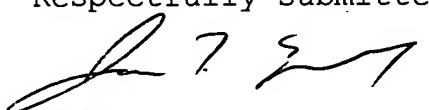
Still further, Koyanagi et al. teach away from the idea of combining navigated movement of an underwater vessel with a thermoelectric device. Specifically, the relevant embodiment of

Koyanagi et al. (FIG. 4) requires that both warm and cold water sources be available at the same time (see column 8, lines 53-59). The warm water comes from the system being located at the water's surface while the cold water must be pumped from the bottom of the sea. However, nothing in Koyanagi et al. teaches or suggests how the simultaneous availability of warm and cold water could be achieved using a navigating underwater vessel as Applicant teaches and claims.

None of the Chao et al., Roesner et al., or Pionetti references teach or suggest any structure to overcome the above-described deficiencies of the Hiller et al. and/or Hiller et al. in view of Koyanagi et al. In summary, even if Hiller et al. could be properly be considered as prior art against Applicant's claims along with the remaining art of record, the claims remaining in the case are considered to patentably distinguish thereover.

It is submitted in view of these remarks that all grounds for rejection have been removed by the foregoing amendment. For the hereinabove reasons, Applicant solicits an early and favorable response.

Respectfully submitted,



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